



National Agriculture Education Accreditation Council

6

**Report of the
Accreditation Inspection Committee
(AIC)**

**Prof. Dr. Hidayat ur Rehman
Prof. Dr. Syed Dilnawaz Ahmad Gardezi**

**Plant Breeding and Genetics Department,
Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi**

NAEAC Secretariat, Room # N-2, N - Block, old Comsats Building, HEC, H-8/1, Islamabad
Ph # 051-90802681, Fax # 051-90802682
Website: www.naeac.org, Email: infonaeac@yahoo.com

Section-1: General:

1.1 Introduction:

The Accreditation Inspection Committee (AIC) setup by the National Agriculture Education Accreditation Council (NAEAC) for the external review of the Degree Programs B.Sc (Hons) & M.Sc (Hons) of the Plant Breeding & Genetics Department of PMAS Arid Agriculture University Rawalpindi visited the department on December 9-10, 2009 for the in-depth review of Plant Breeding & Genetics degree programs. The report of the Committee is presented below:

The AIC met on December 9-10, 2009 in the Department of Plant Breeding and Genetics to carryout external review of the Plant Breeding and Genetics degree program for accreditation. The Chairman NAEAC Dr. Muhammad Tusneem chaired the introductory session of the committee and briefed the members and the Chairmen of all departments along with the Dean Faculty of Agriculture (PMAS, AAUR) about the scope, importance and mandate of the NAEAC. He also answered the questions raised by the faculty regarding the NAEAC in particular and the agriculture education in the country in general

1.2 Accreditation of Agriculture Education Institutions in Pakistan

In pursuance to its mandate given by the HEC under clause 10 subsections (d) and(1) of the bye-laws of NAEAC, an Accreditation Inspection Committee (AIC) was constituted comprising the following scientists to review the degree programs of Department of Plant Breeding & Genetics of PMAS Arid Agriculture University, Rawalpindi for the assessment and accreditation for degree awarding academic programs:

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|-----|---|----------|
| i) | Prof. Dr. Hidayat-ur-Rahman
Chairman,
Department of Plant Breeding & Genetics,
NWFP Agricultural University Peshawar | Convener |
| ii) | Dr. Syed Dilnawaz Ahmed Gardezi
Professor/Chairman,
Department of Plant Breeding and Molecular Genetics,
Faculty of Agriculture, Rawalakot, Azad Kashmir | Member |

The main terms of reference of the committee were as follows:

- To carry out an external evaluation of the academic programs of the Department of Plant Breeding & Genetics PMAS Arid Agriculture University, Rawalpindi for the assessment and accreditation of degree awarding academic programs.
- To synthesize the critical observations recorded on the basis of discussions with the Chairman of the department and interaction with the Dean, the teaching faculty and students, alumni and support staff besides the actual visits to the infrastructure of available laboratories, class rooms and field facilities into a consolidated report.
- To submit the recommendations to NAEAC Chairman.

The itinerary of accreditation visit schedule is given at Annex-I.

1.3 The Department of Plant Breeding & Genetics

The Department of Plant Breeding & Genetics was established in 1982 first under the Agriculture College and then under the Faculty of Crop and food Sciences after the establishment of the University. Since its inception, the Department of Plant Breeding Genetics has been offering degree programs leading to BSc (Hons) and since 1996 MSc (Hons) according to the national agriculture degree program approved by UGC and then HEC with well defined missions and goals. The department started PhD program since 1999. During the past 27 years, the Department has produced more than 238 well trained graduates, 66 MSc Hons. and 5 PhD scholars. The Department has 10 highly qualified (6 PhDs) and experienced faculty, well-equipped laboratories and experimental farm for undertaking research projects. One faculty member has received Post-Doctoral training in Korea recently while four members are enrolled for PhD degrees indigenously and abroad. In addition to academics, objective oriented breeding programs are underway in wheat, maize, sorghum, pulses and oil seed crops, mostly funded through university support. The department owns 1.5 Acre land area on campus and about 4 Acres at Koont Farm (Chakwal) for research and experimentation. The Department has well established Molecular Genetics Laboratory, Gene Transformation and Tissue Culture Laboratory and Cytogenetics Laboratory. There exists very good collaboration between plant Breeding and Genetics Department and related institutions like NARC, NIFA, Institute of Cereal Research, Germplasm Resources Institute and NIGAB. Some advanced lines of wheat produced by the departmental scientists are at micro-trial level for varietal testing and approval.

1.4 Program Mission

The Discipline of Plant Breeding and Genetics is committed to augment the opportunities for higher education, research and training in the disciplines of genetics, crop improvement procedures and emerging sciences like biotechnology and genetic engineering for all the students without any discrimination of caste, color, creed or conviction.

Program objectives

- To impart academic and research training on recent trends at under-graduate and post-graduate levels in the field of Plant Breeding and Genetics. The department aims to create a strong fully interactive community of faculty, students and alumni - in the truest sense of the word.
- To familiarize the graduates with current issues (productivity, quality, biotic and abiotic stresses, and environmental changes) regarding food requirements of increasing population.
- To conduct research for the enhancement of yield, quality and tolerance against biotic and abiotic stresses in field crops of rainfed area.
- To use classical as well as new biotechnological techniques for estimation of genetic divergence and MAS for determination of desirable traits.

1.5 Academic Programs:

Following academic programs are being catered in the department of Plant Breeding & Genetics.

A) BSc (Hons) Agriculture majoring in Plant Breeding & Genetics. The students of agriculture taken after F.Sc. are being offered general introductory courses of all agricultural disciplines during year-1 and year-2 and are allowed to opt for any major subject based on their interest and the merit of their results. The students opting for Plant Breeding & Genetics are taken on competitive base and only students obtaining CGPA above 3.0 are offered the major because of the limitation of seats. Presently, the department takes only 20 students maximum every year based on the availability of Teachers, laboratory space, lecture rooms and field experimentation facilities (See Annexure -II).

B) M Sc (Hons) Degree Program: The students after graduation in Plant Breeding and Genetics are offered MSc Hons degree program, comprising two years of taught courses and thesis research. The courses offered in M.Sc. Hons are given in annexure-III.

C) PhD Program: The students after completion of 18 years of education having M Sc (Hons) in Plant Breeding & Genetics are offered PhD degree program which is for 3-5 years depending upon the performance of the students in the conduct of taught courses and the research. Detail of the courses is given in annexure III.

Section-2: Criterion wise Analysis

2.1 Curriculum Design and Development

The curriculum followed is according to the national curriculum developed through HEC with little modification suitable for the area. The curriculum implemented was designed during the year 2005 which will be revised during the year 2010 under HEC curriculum review program. Undergraduate and post-graduate students were contacted for their views about the contents of the courses, the method of teaching, use of teaching aids, the conduct of practical and field exposure. The students were satisfied about the teaching methodology and the coverage of the theoretical components of the courses. However, there were some dissatisfaction about the laboratory facilities and the conduct of the experiments. Field trips for exposure to crops under study were also found to be satisfactory. The objectives set out by the department were found clear and achievable. These included the capacity building, academic and applied research, development of linkages with sister organizations and stakeholders. Course files are maintained by the teachers/department or the faculty office. Admissions, course registration and withdrawal policy matches with that planned by HEC. Course evaluation system is more or less according to the HEC instructions. The mid semester, final semester and practical examinations are being held according to the schedule given by the controller of examinations centrally.

2.2 Strength and Quality of Faculty

The faculty of the department was found to be moderately qualified covering all areas of Plant Breeding and Genetics. It included conventional breeding, marker assisted breeding, tissue culture and biotechnology, quantitative genetics, however cytogenetics specialty was found to be comparatively weak. Out of 10 faculty members 6 are having PhD, with two from foreign countries and four from inland while the other four members are under the process of acquiring PhD. Only one faculty member have post-doc experience. The faculty have partially availed the seminar/ Conference participation program as offered by the Higher Education Commission. Similarly the faculty exchange program at National level with other Agricultural Universities has not been availed. The department has been able to provide conducive working environment to faculty as they were satisfied in terms of management and benefits available.

Area of specialization of Faculty

Specialization	Faculty with Specialization	Faculty with Ph.D. Degree	Faculty Status	
			Regular	Contract
Plant Breeding	08	05	07	01
Cytology	00	00	00	00
Plant Biotechnology	02	01	02	00
Total	10	06	9	01

2.3 Students Support and Progression

The students have access to the minimum laboratory facilities within the department but have the opportunity to pursue thesis research at the facilities of NARC. The online facilities for literature retrieval and computing facilities were also existing but very minimum at the main library. There is no computer and internet facility for the under graduate and even post graduate MSc (Hons) and PhD students within the department. Admissions system is transparent, and intake is adequate. The students' drop out percentage is very low. The students' support facilities are adequate. We were shown newly developed indoor games and gym facilities provided to the students through paid membership. Student support program in terms of need based scholarships to students were not available for outstanding or needy students. Similarly, interest free loans from banks were also not visible. Student activities including study tours, tutorials were effectively in place and were carried out accordingly. Funds for Post-graduate students research were not clearly marked, however these could be obtained with special sanction from the vice chancellor in a reasonable period of time.

The students graduating from the department are very well placed in various organizations and there is no problem of unemployment. The graduates have shown their managerial skills in many areas at the provincial and national level and hence gained good reputation.

2.4 Infrastructure and Learning Resources

Basic infrastructure was there but the lecture room facilities were sub-standard and minimum within the department. The teaching aids like multimedia and projectors according to the students are not usually used for class lectures. The specialized students of the department can make use of the central library of the university which had operational budget of Rs. 3.0 million in year 2008. The central library has old copies of various journals while new versions are available on the HEC sponsored online system. The laboratories had basic necessary equipment for the training of the students. The newly established facilities although are available but most of the students complete their research outside the departmental laboratories, because the department has strong linkages with the local sister organizations like Directorates of Agricultural Research and NARC and the post graduate students do take the advantage of those linkages. The laboratory staff was found trained to some extent in using the present equipment in labs. Equipment repair facilities and services did not exist in the department.

2.5 Research and Consultancy activities

Research activities of the staff and the students were visited and some projects in the field were observed. The farm activities indicated that the staff is actively involved in research and research activities are pursued in groups according to the crops e.g. cereal research group, oil seed crops group and the pulses group. The department maintained its own seed, fertilizer and other farm inputs store/shed which may need further improvement. The consultancy of the staff out of university was not visible. The department has 4 HEC awardees in Indigenous Scholarship Programs, and the research outcomes are being published in HEC recognized journals/impact factor journals. The research budget is operated by the Chairman through Vice Chancellor approval. The faculty operates the minimum research projects through University funding but no

sponsored project was found in operation, however farmers days and other such events are organized by the department to disseminate the outcome of the research. Activities like writing of text books and arranging of seminars and conferences/workshops are scarce. The Faculty has reasonable number of publications in various Impact Factor Journals.

2.6 Governance and Leadership

The departmental activities were very well organized both in teaching and research but it was observed that funds for practical work and research are not available within the department. The amount mentioned was minimum i.e Rs 25,000-30,000 per year, although need based research funds are available through central Treasury office on Vice Chancellor's approval. The cooperation and coordination among the faculty was quite good. The university statutory bodies like departmental Board of Studies, Faculty Board, Academic Council and Syndicate are in place for smooth running of teaching and research activities as well as other academic and research matters of relevance. The finances are centrally controlled through the treasurer office. The University is short of placement bureau but alumni association does exist and is operative.

2.7 Innovative Practices

The qualification and potential of the faculty was beyond doubt but within the laboratories very less innovation was observed. The students were also demanding very minimum laboratory facilities for general training and to conduct their projects like gel electrophoresis, DNA and protein extraction and analysis and others. Both students-teachers assessment exercises and program assessment mechanisms are operative through the QEC establishments and other bodies of the university. Students grooming and skills are properly enhanced by exposure to seminars and class presentation practices.

Section-3: SWOT Analysis

3.1 Major Strengths:

The department has the following strengths

- The discipline has six PhD out of ten faculty members to work for teaching and research pursuits.
- The internship program of B.Sc(Hons) and examination system was found to be excellent
- Course files and lecture breakups are well maintained and observed by all teachers.
- Faculty members have contributed more than 50 publications in HEC recognized journals and impact factor journals during last five years.
- The department has adequate lab research facilities as well as research farm for the conduct of independent faculty and graduate research.

3.2 Major Weaknesses:

Following weaknesses were identified in the teaching-learning process of degree programs.

- Teaching aids like multimedia and computers are hardly used in teaching, although computer and internet facilities are available.
- Laboratory facilities for students training and experiments exist but the undergraduate students are not allowed to operate these equipment for conducting the practicals.
- Severe shortage of class rooms and faculty offices.
- The Research farm facilities although also exist but need to be maintained and properly looked after.
- Post-graduate research funds are either not available or out of the reach of research supervisor and are maintained by the central office.
- Overall student assessment and grading of degree programs is poor hence the students average GPA of B.Sc (Hons) and M.Sc (Hons) is 3.2 and 3.4 respectively.
- Merit scholarships are also very few, at least 10% students are to be awarded scholarship.
- No regular mechanisms for faculty and students seminars exist in the department.

3.3 Major Opportunities:

- The academic programs of PBG are well established as it is in place since 1982, with a view to upgrade the degree programs, excellent opportunities of academic linkages with reputed local and international institutions such as NARC, ICARDA and CIMMYT may be explored.
- The department may train the graduates with advanced techniques of plant breeding including MAS (marker assisted selection), doubled haploid production, tissue culture and gene transformation for which the expertise is readily available.
- Post-graduate teaching and research may be further improved by providing needed facility and resources at program level.

3.4 Major Challenges:

- The department is slowly moving with the technological advancement as could be seen by the status of their laboratories. The acquisition of crop breeding technology for rain fed agriculture and students training accordingly are inevitable.
- Although the innovative techniques of plant improvement are being tackled, the faculty is not conducting research activities within the departmental laboratories; they rather take advantage of the facilities at NARC. Hence some minimum research activities need to be addressed within university campus.
- Teachers training and development during the last 5 years has been on very low profile.

3.5 Stakeholders View Point

Students realized that the computer knowledge of under and post-graduates students was inadequate, the communication and presentation skills are weak. They also need more training to use modern laboratory equipment. Internship and practical training should be a regular feature for all students with a view to developing a strong and effective program.

Old students possess sound knowledge, effective communication skills and some even good management and leadership qualities. Alumni association at the department level is functional but need to be strengthened.

Section- 4 Recommendations:

4.1 General Recommendations

- Lecture rooms facility is inadequate. There must be 4 lecture rooms at least for the undergraduate and master students in the department. More lecture rooms and teaching aids like use of multimedia and digital library resources.
- The student's field tours must be made mandatory for their field exposure and first-hand knowledge of the crops and problems especially for the undergraduates.
- The teachers and post-graduate research collaboration must be developed at national and international level for more meaningful research.
- The farm land and experiments need improvement by assigning additional job of farm management to a teacher of the department and recruiting of additional farm personnel.
- Post-graduate students were found involved in the research in the fields which reflects the practical training being imparted by the department is strength of the department, similarly undergrad students should also be involved in this healthy activity.
- Fringe benefits need to be provided to the faculty members, including on campus residence, medical facilities and children pick and drop facilities.
- Strong system of students' scholarships from the university sources and from the donor agencies/zakat, baitulmal need to be established.
- The departmental library needs space. New edition of text books/reference book must be purchased and maintained in the departmental library.
- Internship at the final year of B Sc (Hons) degree must be made mandatory and it shall be extended either to farmer's field or agriculture related institutions.
- The students progress must be monitored including the maintenance of their registers, roll calls, the lab and field work.
- The department must develop its own Computer lab and cabins for postgraduate students within the department. Latest editions of books may be purchased/ copied through HEC/ the National Book Foundation.
- Training of teaching faculty as well as lab staff in teaching methodology and lab skills, respectively to further boost their efficiency and output.
- Extensive use of multimedia and other audio-visual aids for enhanced and effective communication with students.
- Establishment of better liaison and collaboration with research institutes and progressive farmers for student's internship and on-job training as well as joint/collaborative research.
- Strengthen Laboratory research activities within the department without disturbing the closer liaison with sister organizations like NARC and others.
- More funds for the departmental research activities by empowering the chairman to utilize the funds, instead of central control.

42. Final Recommendations

On the basis of the inspection/evaluation, the AIC recommended accreditation of the degree programs of Plant Breeding and Genetics (PBG), PMAS Arid Agriculture University, Rawalpindi in the “X” category as per HEC rating system i.e. Degree Program having minor shortfalls.

4.3 Signatures of AIC Members

Name and Designation

Signatures

Dr. Hadyat-Ul-Rehman

(Convener)

Professor/Chairman Department of
Plant Breeding & Genetics NWFP
Agricultural University Peshawar

Dr. Syed Dilnawaz Ahmad Gardezi

(Member)

Professor/Chairman Department of
Plant Breeding & Molecular Genetics,
Faculty of Agriculture (UAJ&K)
Rawalakot, Azad Kashmir

Dated: December 10, 2009

4.4 Comments and Signatures of Chairman

I agree with the observations and recommendations made by the peer team in this report.

Chairman

Department of Plant Breeding & Genetics
PMAS Arid Agriculture University,
Rawalpindi

1.1**Itinerary of Accreditation Visit****Host Institution:****PMAS University of Arid Agriculture Rawalpindi****Institute/ Program:****Department of Plant Breeding and Genetics, B.Sc (Hons) & M.Sc (Hons)-PBG****Review Team:**

1. Prof. Dr. Hadyat-Ul-Rehman (Convener)
Chairman
Department of Plant Breeding & Genetics,
NWFP Agricultural University Peshawar
2. Prof. Dr. Syed Dilnawaz Ahmed Gardezi,
Professor/ Chairman, Department of Plant Breeding and Molecular Genetics,
Faculty of Agriculture, Rawalakot, Azad Kashmir

Institute Coordinator:

Dr. Zahid Akram, Assistant Professor

NAEAC Resource Person:

Mr. Raja Mehtab Yasin, Admin/ Finance Officer, NAEAC Secretariat

Schedule of Visit:**December 9-10, 2009 (Two Days)**

Day 01	Time	Activity	Remarks
	09:00-09:30	Meeting with Dean of the Faculty <ul style="list-style-type: none"> • AIC Convener Explains purpose of the visit • Describes the Program review process 	Convener of AIC
	09:30-10:00	Meeting with Chairman, Department of PBG	All AIC Members
	10:00-11:30	Presentation: Chairman of Department of PBG <ul style="list-style-type: none"> • History of Institute/ Academic Programs • Mission Statement • Program Goals and Objectives • Annual operational budget (08-09) & Human Resources (Total) • Curricula Summary, Revision/Update • Admission and withdrawal policy • Faculty Summary, Qualification/ Experience, Support Staff • Students Feed back • Grading System • Infrastructure Summary, Labs, Greenhouse, Library • Employers Feedback • Alumni Survey • Parents Viewpoint • Question/Answer Session 	All AIC Members
	11:30-13:00	Curriculum Review: Department Coordinator <ul style="list-style-type: none"> • Course files maintenance • Attendance requirements • Examination Record • Session/Semester Record • Evaluation Instruments • Research Projects by faculty / students 	All AIC Members
	13:00-14:00	Zohar Prayers & Lunch	
	14:00-16:00	Infrastructure Visit: Department Coordinator <ul style="list-style-type: none"> • Research & Teaching Labs • Greenhouses & Experimental facilities • Departmental and main Library • Computer Labs, Internet and multimedia facilities • Classrooms number & size with multimedia • Faculty Offices & facilities 	All AIC Members

	16:00-17:00	Meeting of AIC for review and synthesis	
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Itinerary of Accreditation Visit

Host Institution: PMAS University of Arid Agriculture Rawalpindi
Institute/ Program: Department of PBG, B.Sc (Hons) Agric. & M.Sc (Hons) -PBG

Day 02	Time	Activity	Remarks
	09:00-09:30	Meeting with Dean of the Faculty <ul style="list-style-type: none"> • Briefing on yesterday's activities of the visit • Seek guidance/help if required 	All AIC Members
	09:30-11:30	Faculty Meetings: 10-15 minutes for each faculty member <ul style="list-style-type: none"> • Graduation and Higher studies • Personal Background • Area of Interest Vs teaching –learning environment • Perception about the academic programs, Students and peers • Opportunities for professional growth • Research Opportunities • Salary Perception and other incentives • Teaching Load, student- teacher ratio • Meetings with Support Staff 	Individual AIC Member
	11:30-13:00	Classroom Visit: Two classrooms with 45 min. each <ul style="list-style-type: none"> • Students Interviews (B.Sc Hons final & M.Sc Hons) • Students Assessment System (Institute Coordinator) • Students Perception about Teaching-Learning Environment • Students Feedback Mechanism Exists • Senior students views and suggestions to improve teaching-learning environment and facilities 	All AIC Members
	13:00-14:30	SWOC Analysis: faculty /students point of view <ul style="list-style-type: none"> • Major Strengths of Academic Programs • Major Weaknesses of Academic Programs • Major Opportunities for Academic Programs • Major Challenges for Academic Programs 	All AIC Members
	14:30-15:30	Concluding Meeting with Chairman of the Department	
	15:30-16:30	Prayers and Lunch	
	16:30-17:30	Concluding/ Exit meeting with Dean/Exit Meeting <ul style="list-style-type: none"> • Salient Findings of the visit • Formulation of Recommendations • Next Procedure 	
	17:30-19:30	Discussions among the AIC for synthesis & report outline	
	19:30	End of Review Visit	

STRENGTH AND QUALITY OF FACULTY

S. No	Name	Position	Qualification	Experience (years)	Specialization
1.	Dr. Saifullah Ajmal	Chairman	Ph.D	30	Breeding Cereal crops
2.	Mr. Nasir M.Minhas	Assistant Professor	M.Phil	21	Breeding cereal crops
3.	Dr. Zahid Akram	Assistant Professor	Ph.D	17	Breeding for quality in cereals, use of molecular markers in crop improvement
4.	Dr. Ghulam Shabbir	Assistant Professor	Ph.D	19	Breeding and genetics of oilseed crops, use of tissue culture techniques for crop improvement
5.	Dr. Talat Mahmood	Lecturer	Ph.D	19	Breeding and genetics of pulses and oilseeds
6.	Mr. Mahmood ul Hassan	Lecturer	M.Sc(Hons) Agri	7	Genetic transformation in oilseed crops
7.	Mr. Saad Imran	Lecturer	M.Sc(Hons) Agri	6	Use of biotechnology in crop improvement
8.	Mr. Nasir Ghafoor Khan	Lecturer	M.Sc(Hons) Agri	7	Use of biotechnology in crop improvement
9.	Dr. Khizar Hayat	Subject Specialist	Ph.D	40	Sorghum breeding

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Profile of Support Staff of Plant Breeding and Genetics Department

S#	Name & Designation	Qualification	Experience (years)	Major Duties
i	Hafiz Wajid Imran, Computer Assistant	Intermediate	7	Office work
ii	Saeed Khan, Stock Assistant	Matric and Diploma in Stock Assistant	23	Laboratory and field work
iii	Sanallah, Field Assistant	Matric and Diploma in Field Assistant	4	Field work
iv	Muhammad Yasir, Field Assistant	Intermediate Diploma in Field Assistant	3	Laboratory and field work
v	Asif Ejaz Butt, Lab Attendant	Middle	19	Field and lab work
vi	Aamir Nadeem, Lab Attendant	Graduate	4	Office work
vii	Muhammad Afzal, Lab Assistant	Intermediate	7	Lab work
viii	M. Younis, Naib Qasid	Matric	17	Office work
ix	Raja Babar Javed, Beldar	Middle	7	Lab and field work
x	Shahid Mahmood, Cattle Attendant	Middle	7	Office work
xi	Muhammad Hussain, Naib Qasid	Middle	8	Office work

B.Sc (Hons) COURSES, PLANT BREEDING AND GENETICS

Course #	Title	Credit Hours
PBG – 401	INTRODUCTORY GENETICS	3(2-2)
PBG – 402	INTRODUCTORY PLANT BREEDING	3(2-2)
PBG – 501	GENETICS OF CROPS	4(3-2)
PBG – 502	BASIC MOLECULAR GENETICS	3(3-0)
PBG – 503	BREEDING OF SELF-POLLINATED CROPS	3(2-2)
PBG – 504	BREEDING OF CROSS-POLLINATED CROPS	4(3-2)
PBG – 505	CYTOGENETICS IN CROP IMPROVEMENT	3(2-2)
PBG – 506	NEW TRENDS IN CROP IMPROVEMENT	3(3-0)
PBG – 507	GENETIC DIVERSITY AND GERMPLASM RESOURCES	3(3-0)
PBG – 601	QUANTITATIVE GENETICS	3(3-0)
PBG – 603	CROP BREEDING FOR QUALITY	3(2-2)
PBG – 605	BREEDING FOR DISEASE AND INSECT RESISTANCE	3(2-2)
PBG – 607	BREEDING FOR STRESS CONDITIONS	3(2-2)
PBG – 609	PROJECT PLANNING AND REVIEW OF LITERATURE	3(1-4)
PBG – 610	INTERNSHIP	20(0-40)

Semester III

PBG - 401 INTRODUCTORY GENETICS 3(2-2)

Semester IV

PBG - 402 INTRODUCTORY PLANT BREEDING 3(2-2)

Semester V

PBG - 501 GENETICS OF CROPS 4(3-2)

PBG - 503 BREEDING OF SELF-POLLINATED CROPS 3(2-2)

PBG – 505 CYTOGENETICS IN CROP IMPROVEMENT 3(2-2)

PBG – 507 GENETIC DIVERSITY AND GERMPLASM RESOURCES 3(3-0)

Semester VI

PBG - 502 BASIC MOLECULAR GENETICS 3(3-0)

PBG - 504 BREEDING OF CROSS-POLLINATED CROPS 3(2-2)

PBG - 506 NEW TRENDS IN CROP IMPROVEMENT 3(3-0)

AGR-506 STRESS PHYSIOLOGY 4(3-2)

Semester VII

PBG - 601 QUANTITATIVE GENETICS 3(3-0)

PBG - 603 CROP BREEDING FOR QUALITY 3(2-2)

PBG - 605 BREEDING FOR DISEASE AND INSECT RESISTANCE 3(2-2)

PBG - 607 BREEDING FOR STRESS CONDITIONS 3(2-2)

PBG - 609 PROJECT PLANNING AND REVIEW OF LITERATURE 3(1-4)

Semester VIII

PBG - 610 INTERNSHIP 20(0-40)

**POST GRADUATE (M.Sc Hons & PhD) TAUGHT COURSES
PLANDT BREEDING AND GENETICS**

Course #	Title	Credit Hours
PBG-701	PRINCIPLES OF PLANT BREEDING	3(2-2)
PBG-702	CYTOGENETICS OF CROP PLANTS	3(2-2)
PBG-703	BIOMETRICAL GENETICS	3(2-2)
PBG-704	ADVANCED METHODS IN PLANT BREEDING	3(2-2)
PBG-705	MUTATION BREEDING	3(3-0)
PBG-706	EVOLUTION OF FIELD CROPS	2(2-0)
PBG-707	ADVANCED GENETICS	3(3-0)
PBG-708	GENETIC ENGINEERING AND BIOTECHNOLOGY	3(3-0)
PBG-709	BREEDING OF FORAGE CROPS	3(2-2)
PBG-710	EVOLUTION OF FIELD CROPS I	3(3-0)
PBG-711	CEREAL GENETICS	4(3-2)
PBG-712	MAIZE GENETICS	4(3-2)
PBG-713	ADVANCED CYTOGENETICS	3(3-0)
PBG-719	SPECIAL PROBLEM	1(1-0)
PBG-720	SEMINAR	1(1-0)
PBG-721	SEMINAR	1(1-0)